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Pro-circular behaviours and refrigerated display cabinets: supporting resource efficiency in the retail refrigeration sector

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Abstract

There is a need to change business and behaviour models from the linear to the circular in order to conserve energy and resources. This paper identifies what pro-circular behaviours can influence the development of a Circular Economy, with particular reference to the retail refrigeration industry.

Pro-circular behaviour is an action that is brought about due to the prioritisation of resource-efficiency with the aim of supporting the growth of a Circular Economy. A Circular Economy is an economic and industrial system where resources are kept in use for as long as possible. Greater uptake of alternative business models in the UK could help to create a more sustainable industry in retail refrigeration.

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1. Introduction

A Circular Economy can eliminate waste, provide resource security and lessen the environmental cost in the production and consumption of products. It is an alternative to the linear economy, which was established in the early days of the industrial revolution and is still prevalent in the majority of industries to date, including the retail refrigeration sector. The linear economy is based on the "take-make-use-dispose" path, where products are made, used and disposed of at the end of their life. This linear approach can lead to resource overuse, waste and is founded on the naive assumption of an infinite material supply. While this practice is common, governments [1, 2] and businesses are beginning to realise the "importance of moving to a more sustainable economy" [2].

Refrigerated Display Cabinets (RDCs) are used to stock and display chilled, frozen food and beverages in retail grocery stores. The manufacture of cabinets is typified by the extensive use of materials and energy, meaning that the development of a Circular Economy in this sector is particularly important. Businesses in the retail refrigeration sector can take a more circular approach to production and consumption through adopting alternative business models, such as repair, refurbishment and remanufacture of products [3].

Using Refrigerated Display Cabinets as an example, this paper illustrates the deficiencies of the linear production path and provides options for the implementation of pro-circular behaviours that can boost resource efficiency in the retail refrigeration sector. It also attempts to outline a number of environmental and economic benefits the alternative business models can bring.

2. Deficiencies of linear production in the retail refrigeration industry

The Centre for Remanufacturing and Reuse (CRR) forecasted that in 2015 around 81,000 *end-of-life* core Refrigerated Display Cabinets were available to be refurbished and remanufactured [4]. However only 15% of these cabinets were assumed to be re-engineered to a 'good-as-new' condition and bought by the UK retailers. The remaining 85% of cabinets were disposed of and replaced by new cabinets. This means that with an average cabinet weighing 750 kg [4], around 51,000 tonnes of long-life reusable components entered the waste steam in 2015 instead of being re-used. This amounts to an estimated 43,350 tonnes of metal, 1,530 tonnes glass, 4,590 tonnes of polymers. This level of disposal shows the scope for resource efficiency in the retail refrigeration sector, which in turn highlights the industries lack of pro-circular behaviours.

These disposal figures are even more remarkable when we take into account the amount of money UK retailers spent on importing new Refrigerated Display Cabinets from outside the UK, which in 2015 was £69.5 million [5]. This is equivalent to approximately 255,000 units. Cabinets imported from outside the UK and typically cheaper than those produced in the UK, though can often be lower in quality, energy-efficiency and life expectancy [4]. With scope for the UK to make approximately 81,000 units available through refurbishment and remanufacture in 2015, over a third of these imports could have been sourced within the UK market.

The creation of a new refurbishment and remanufacture market in the UK retail refrigeration sector is a job creation opportunity. Latest figures show there is an estimated 1.6 million people unemployed in the UK [6]. Therefore, there is scope for manufacturers to train (e.g., apprentices) and hire more staff (temporary and permanent) should the retail refrigeration industry become more pro-circular and there be a demand for refurbished and remanufactured cabinets.

3. Pro-circular behaviours of the retail refrigeration sector

Literature on the Circular Economy frequently discusses need for behavioural change. To date, behaviour has not been identified and defined in Circular Economy literature. To distinguish specific behaviours that support the development of a Circular Economy, authors of this paper propose to define pro-circular behaviour as: a*n action which is brought about due to prioritising resource-efficiency. This behaviour benefits or at least reduces damage to the environment, economy and society.* Examples of pro-circular behaviours specific to the retail refrigeration